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**THE PROBABLE INFINITY OF NATURE AND LIFE. WILLIAM EMERSON RITTER, Ph.D.** The Gorham Press. 1918. Pp. 164. \$1.25.

I shall mention at the start two defects of this book, in order to have done with them early; for though prominent, they are not vital. The first is careless proof reading. Commas are occasionally out of place, and many words, including several proper names, are misspelled, the most unfortunate instance appearing in the dedication, where *Le Coute* is written for *Le Conte*. The second defect is a lack of sure-footedness in the field of physics, which the author, who is Director of the Scripps Institution for Biological Research, of the University of California, enters needlessly and where he often comes to grief. He spends about six pages in stating and refuting certain propositions of M. Gustave Le Bon, whom, I am confident, physicists would not generally accept as an expounder of their beliefs. He rejects the hypothesis of "the ether of space" on the curiously mistaken ground that physicists regard this ether as incapable of motion. He speaks rather scornfully of the "ultimate Atoms or Electrons of present-day physico-chemical metaphysics," partly because he objects to anything ultimate and partly because he opposes the idea of any possible divorce between electricity and matter. In neither of these criticisms of the electron belief is he, in my opinion, justified. The generation of physicists and chemists that has shattered, or at least splintered, the old-fashioned atom is not likely to make the mistake of supposing that the electron is essentially indivisible, however incapable we may be, at present, of dividing it experimentally. Moreover, the builders of the electron theory, instead of seeking to separate electricity and matter, are trying to explain matter by means of electricity; and surely one might expect that Professor Ritter, who will hear nothing of ultimates, would welcome this endeavor to explain ideas or phenomena heretofore regarded as final by others still more fundamental. That he does not do so is a curious fact which will be commented on later.

The following passage is significant: "Slight as was my training in these provinces [magnetism and electricity], and faded as are most of the facts and mathematical equations presented to me in my college days, very distinct pictures are still before my mind of sticks of sealing wax, chunks of amber, the skins of various small animals tanned with the hair on, pieces of flannel cloth, scraps of pith, bars of iron of various shapes and sizes, and so on, whenever the subject of magnetism was up for treatment." Now a man who thinks that "chunks of amber" and "scraps of pith" are the proper materials for illustrating magnetism may have perfectly sound ideas regard-

ing other matters of human knowledge, but he cannot parade such ignorance, while criticizing the beliefs of physicists, without discrediting to some extent his authority on matters with which he is more familiar.

But this, after all, is no great harm, for few of us expect authoritative answers to questions touching infinity; stimulating suggestion is all that we can reasonably look for, and this the book before us is capable of furnishing. It is well for us to have these questions represented occasionally, if only to be reminded that there is still mystery, even in the physical world, and probably always will be.

The author's main thesis, or a very important part of it, is presented in the passage which follows: "The conclusion pointed to is that the Cosmos or Universe or total order of things is genuinely infinite. By genuinely I mean infinite, not in the sense of subjectivist metaphysics or theology, but of physical science and mathematics. A short description or characterization of the Cosmos from this standpoint would be that it consists of an infinite number of bodies, each belonging to an infinite series, and that of all these bodies every one has some attributes in common with all the others but not one is exactly like any other." He seems to think, and perhaps he is right, that most people believe the material world to have existed in some form eternally. But he takes it for a fact that many who admit the past eternity of matter balk at accepting a past eternity of life, and he asks us to "reflect upon the relative difficulties in the conceptions that the oxide of iron, for instance, has existed forever, while organic beings must have begun, actually *de novo*, sometime, somewhere." He reminds us that "the great controversy of the Pasteur-Pouchet period, culminating in Tyndall's memoir of 1875, ended in the complete overthrow of the theory of spontaneous generation as then held," and he has no expectation whatever that Professor Jacques Loeb, for example, will ever succeed in producing life from materials which are not themselves the product and the seat of life.

Is Professor Ritter, then, a "Vitalist" in biology, as Professor Loeb is a "Mechanist." He refuses to go into either of these categories, neither of which, in his opinion, is satisfactorily defined. Undoubtedly he is a materialist, for he recognizes no properties or functions apart from matter. He rejects Louis Agassiz's "fallacy" of "attributing to Deity the power of *thinking sensible objects* into existence." He seeks to refute "Bergson's argument that the creativeness which is distinctive of the evolutionary process is wholly unique and requires the invocation of an impulsion from a source wholly beyond the realm of material things."

If we seek for one word additional to "materialist" for the characterization of Professor Ritter as a philosopher, we must call him an extreme pluralist. He rejoices in multitude, multitude of objects, multitude of substances, multitude of causes. The first quotation I have made from him must be taken literally as expressing his belief that no two of all the objects in the universe are exactly alike in their essential qualities. He holds that every individual animal or plant produces chemical substances the exact like of which were never produced and never will be produced by any other animal or plant. He does not make or welcome attempts to find fundamentals, few things explaining many. Hence, in part, his aversion to the conception of electrons. Herein, it seems to me, lies Professor Ritter's originality, and his contribution, such as it is, to philosophy. According to him, organisms, living bodies, tap sources of chemical energy which the processes of the laboratory cannot discover, and they do this by disintegrating the atoms of so-called elements, each act, each thought, each emotion, making use of some chemical reaction peculiar to itself; and, as no two individuals are precisely alike in their acts, thoughts, and emotions, no two individuals are the seats of precisely the same kinds of chemical reaction. Naturally, a chemical philosophy which begins by declaring itself outside the reach of present chemical tests can be neither confirmed nor refuted, though it may be rejected, by the chemists.

True to his love for multiplicity, the author closes his book with a chapter on Multiple Causes in Organic Evolution, from which the following characteristic passage is taken: "It is curious, once one comes to think of it, that Darwin and the rest of us should have talked so long and so absorbedly about one or a few 'factors' of evolution, when the demands of rigorous science are that there shall be at least as many causes as there are species. Were this not so, the same cause would produce different effects, and that would make biology a hocus-pocus indeed. Supernatural causes would be quite as amenable to science as such natural ones." And so he calls himself neither a Darwinian nor a Lamarckian, though he accepts natural selection as a real factor in evolution and, on the other hand, recognizes "a group of external causes producing 'body' changes, and a group of internal causes, no matter what their nature, producing after a while corresponding 'germinal' changes."

Professor Ritter says nothing, I believe, as to the bearing of his conception of the infinity of life in general on the question of the permanence of individual life, and as a thorough-going materialist he may not think this question worth considering. Yet one can

hardly avoid the following reflection: If the life of every individual should completely end, evidently an event much more readily imagined than the annihilation of all matter, all life would be extinct, and it could never come again. Thus we have the curious conception of life extending through a past eternity but coming to an end in the present or the finite future. I wonder whether Professor Ritter's philosophy would be satisfied with a terminated infinity. If not, is he, as an undoubting materialist, ready to accept that other weird conception, of a material essence of life, a ponderable soul, escaping from the body at death ?

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ALCOHOL; ITS ACTION ON THE HUMAN ORGANISM. Report of the Central Board of the Liquor Traffic of England. Longmans, Green, & Co. 1918. Pp. xii, 133. 60 cents.

The adoption of constitutional prohibition by the United States will probably result in a more careful examination than ever before into the scientific foundations of our knowledge concerning the effects of alcoholic beverages taken in so-called small amounts. In comparatively recent years a number of surveys of the alcohol literature have been made. Frequently the authors of such summaries have revealed a partisan attitude in their choice of sources and in discussing "established results," so that perhaps no other scientific subject has suffered more from over-statement. Consequently it is important to understand something of the circumstances which prompted the preparation and publication of this book, and to note the personnel of the authors whose breadth of view is reflected in it.

By a prefatory announcement we are informed that in November, 1916, the British Central Control Board (Liquor Traffic) appointed an Advisory Committee with instructions "to consider the conditions affecting the physiological action of alcohol, and more particularly the effects on health and industrial efficiency produced by the consumption of beverages of various alcoholic strengths, with special reference to the recent Orders of the Central Control Board, and further to plan out and direct such investigations as may appear desirable with a view to obtaining more exact data on this and cognate questions." The committee appointed comprised the following personnel: Lord D'Abernon (Chairman), Chairman of the Central Control Board; Sir George Newman, Principal Medical Officer of the Board of Education; A. R. Cushny, Pharmacologist; H. H.